

Assessment of Information and Communication Technologies in Afghan Agricultural Extension



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The primary purpose of the assessment was to inform project efforts and build organizational knowledge. The results have been positive in this regard, and we therefore provide the document to others with the aim to inform organizations seeking to employ information and communication technologies in Afghan agricultural development.

While we have attempted to be as thorough and objective as possible, the information in this report is not based on systematic field tests and surveys, but rather but rather interviews, case studies, and literature reviews. Consequently, we refrain from making concrete recommendations. Rather, this report should be viewed as an introduction to information and communication technologies for agricultural development in Afghanistan. Readers should also be aware that the project landscape as well as the ICT landscape in Afghanistan is changing very rapidly. Consequently, the information herein is highly time-sensitive and should be corroborated before utilization. The statements expressed herein are solely that of the authors, and do not necessarily represent the International Programs Office, the College of Agriculture and Environmental Sciences, the University of California Davis, or the United States Department of Agriculture.

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Rationale

Afghanistan is well suited for use of information and communication technologies (ICT) in agricultural extension, but no coherent bodies of knowledge regarding the ICT in Afghan extension landscape currently exist. This assessment aims to inform organizations seeking to employ ICT in agricultural development in Afghanistan about current players and recourses, past efforts, and potential keys to success.

Executive Summary

Although more than 80% of Afghans are farmers, little or no agricultural extension support is available in Afghanistan, promoting unproductivity, hunger, and poverty. Following decades of war, infrastructure remains largely undeveloped due to difficult geographic and security situations. Nevertheless, the communications sector is relatively well-developed, making ICT a reasonable option for improving access to agricultural information for both farmers and regional extension agents. Among a handful of existing agricultural ICT projects, there remains a dearth of services providing production information to Afghan farmers and extension agents. These circumstances present the opportunity to deliver needs-based production information to farmers and extension agents in the field. Mobile phone and radio communications are the most promising for agricultural extension. However, major challenges remain, including unreliable electricity, widespread rural illiteracy, and lack of computer skills among potential staff. Furthermore, as international project support is progressively withdrawn, adapting to the current state of ICT and the existing needs of stakeholders in Afghanistan will be key to the sustainability of any new initiatives. Promising options include reformatting existing Internet resources (i.e. RONNA, Paywand, e-Afghan Ag) for SMS and radio delivery in collaboration with well-established stakeholders in various sectors (i.e. Ministry of Agriculture, Salam Watandar, Paywast). Early involvement of such collaborators will help ensure the situational appropriateness and sustenance of such an initiative.

Summary of Challenges and Opportunities

Various opportunities make Afghanistan a great fit for ICT-based extension efforts:

- The geography is very difficult to navigate, making remote communications a more reasonable option.
- The current lack of travel budgets for district extensionists to meet in person with farmers (International Executive Service Corps 2012) makes remote communications the next best alternative.
- Few agricultural ICT services currently exist; increased competition would drive up quality and drive down prices of services (Cisco 2012).
- In-country organizations are seeking to outfit district extension (DAIL) offices with Internet access, equipment, and ICT training (International Executive Service Corps 2012), creating an important opportunity to integrate reliable ICT services into these extensionists' portfolios.
- ICT could allow extensionists and farmers to share their knowledge and discoveries with the wider community, helping meet the great need for production of local scientific knowledge and content (MAIL 2012b; Hamdard 2012).
- Prolonged war has generated a generational knowledge gap among farmers, extension agents do not have access to updated information, and even material taught by universities may be more than 30 years old. ICT would enable access to updated information.
- ICT is typically well-received by youth, who compose a significant majority of the Afghan population (65% are under 25 years) (USAID and Gharib 2013).
- Illicit crops currently lack comparable alternatives with respect to reliable sales (MAIL 2012b), often because markets (particularly value-added markets)(ibid) are unknown or unavailable to farmers; ICT offers the opportunity to connect market stakeholders.

Likewise, some challenges exist, including:

- Security remains fragile, threatening ICT infrastructure and individuals who share information across ICT channels.

- Tariffs remain among the highest in the geographic region due to a combination of poor security, high energy costs, and pro-market policy (Lokanathan 2012) (see Regulatory Institutions and Policy section).
- Electricity is not generally available in rural areas (see Electricity Services section).
- Technology and network access remain limited (Hamdard 2012).
- Illiteracy rates are very high (Ministry of Education 2008). This makes SMS impossible for most, even while voice services remain costly (see Mobile Phone Services section).
- About 62% of Afghans are in poverty or highly vulnerable to falling into poverty (IFAD 2010). This makes paying-- even for beneficial services-- unviable for most households.
- Infrastructure necessary for ICT functionality (towers, lines, etc.) remains very limited in rural areas.
- Land productivity is low in many areas, limiting the benefit:cost ratio for paying for extension services (MAIL 2012b).
- Widespread corruption discourages trust or investment in institutionalized systems (Cochran Afghan Fellows 2013).
- The workforce is largely untrained, and even the most qualified individuals (such as Ministry of Agriculture personnel) have limited ICT skills (MCIT 2012).
- The significant digital gender apartheid limits women's access to and understanding of ICT technologies (Wilcox 2013), thus reducing the potential user base and impact.
- The country lacks international trade relationships and economic integration (Fick and Lockhart 2010), thus limiting market opportunities and subsequently the cost:benefit ratio of paying for extension services.
- Existing extension projects are expensive, uncoordinated, and run by a myriad of donors (International Executive Service Corps 2012).
- Afghans culturally prefer receiving information from personal contacts than scientific or institutionalized sources (like databases, libraries, etc.) (Wilcox 2013).

Background

Thirty-five years ago, Afghanistan was producing a gamut of agricultural goods, including nuts, fresh and dried fruits, leather, cotton, and wool. The country also became renowned for its carpet and embroidery production, which was fed by crop and animal agriculture. Exports at the time were valued at 600 million USD (FAO 2013). Protracted war and violence has left Afghanistan in a very different situation, with more than 35% of the population unemployed, and an equivalent amount living in poverty (CIA World Factbook 2013). Nevertheless, as Afghanistan seeks to rebuild itself, agriculture continues to hold perhaps the greatest potential in creating national and international socio-economic stability. Unfortunately, the dramatic instability faced by rural families has made illicit production of drugs an attractive alternative to the products traditional grown in Afghanistan; these unlawful crops promote the cycle of violent extremism. Fostering legitimate agriculture would encourage economic growth and create jobs, as well as slow a major source of funding for extremist groups. Some of the most promising opportunities for agricultural export include fruits (such as grapes, pomegranates, and melons), nuts (including almonds and pistachios), spices (such as saffron and cumin), and animal products (such as leather and wool) (Fick and Lockhart 2010).

Currently, only about 10% of farmers receive any sort of information on agricultural production, and 15% of herders have access to veterinary services. Furthermore, even the quality and delivery of these extension services are weak and inadequate (MAIL 2012b); extension agents have no information access, and even material taught by universities may be more than 30 years old. Afghan extension agents have expressed great need for access to reliable, updated extension information (Cochran Afghan Fellows 2013; Priorities Identification Workshop Participants 2014). When compared to the robust support network provided to farmers by developed country extension services, this description makes clear the truly dire situation Afghan farmers face in merely feeding their own families. Nearly all of Afghanistan's 34 provinces contained rugged terrain, and lack transportation infrastructure and stable electricity (Euromonitor 2012). Additionally, extensionists lack travel budgets (International Executive Service Corps 2012), and the rural areas remain insecure and often violent. This combination of circumstances makes face-to-face agricultural extension seem an unlikely prospect. Information and communication technologies, used in concert with credible and reliable information sources, may offer a unique opportunity to overcome these formidable challenges. Nevertheless, Afghans

traditionally prefer personal sources of information to institutionalized or standardized ones (Cochran Afghan Fellows 2013). This makes extensive education on accessing, adapting, and applying the information provided an indispensable part of any ICT initiative (Wilcox 2013).

The population data of Afghanistan is controversial and very likely unknown, given that the only population census ever executed in Afghanistan (1979) was aborted due to security problems (MAIL 2012b). The CIA World Factbook reports approximately 31.8 million people in July 2014. Afghan government statistics suggest much lower numbers ranging between 24.3 and 27.3 million (MCIT 2012; Afghan Central Statistics Organization 2014). Consequently, percentages and numbers given here may clearly vary based on actual population (Hamdard 2012). About 49% of the population is female, and 65% is under the age of 25 (USAID and Gharib 2013).

The ICT Landscape

Regulatory Institutions and Policy

The Afghan telecommunications sector is overseen jointly by the Ministry of Communications and Information Technology (MCIT) and the Afghan Telecom Regulatory Authority (ATRA). MCIT designs and implements sector policy. ATRA oversees license provision, renewal, and modification; regulatory compliance; and consumer interests (Lokanathan 2012). Relevant policies to this assessment include (Lokanathan 2012):

- Telecommunications Services Regulation Act -the ‘Telecom Act’-(2005) mandates:
 - Non-discriminatory entry of service providers and operators to the market. This includes allowances for 100% foreign ownership of telecommunication companies and 100% profit transfer out of the country.
 - All operators with Significant Market Power (SMP)¹ must provide interconnection where needed. Interconnection rates have to be cost-based and non-discriminatory. While there are no operators with SMP yet, this rule is being enforced for all operators.

¹ An SMP operator holds more than 25% of a telecommunications market in the geographic area in which it is allowed to operate (OECD 2005).

- Tariff regulation for operators with SMP, including publishing and filing latest tariffs with ATRA, and obtaining ATRA approval for new services or changes to tariffs. Again, while no Afghan companies currently have SMP, all operators are being required to submit their tariffs.
- Regulation of competitive process and anti-competitive practices.
- Granting of ATRA with dispute resolution power.
- Universal service charge of 2.5% of gross revenues for GSM² operators and 1.5% to LFSP³ operators.
- Basic quality of service standards and associated fines for non-compliance, as determined by ATRA.
- Open Access Policy (2012) ensures access to shared and scarce resources through the principles of non-discrimination, transparency and cost-based pricing. It particularly addresses the access to the National Optical Fiber Cable (OFC) currently owned by Afghan Telecom, a national provider. ATRA will define service quality guidelines and propose a tariff plan for Afghan Telecom. ATRA conducts market analyses periodically to ensure that no abuse of SMP has occurred with respect to shared infrastructure.
- Telecom Development Fund (2008) is administered by ATRA and aims to establish connections in isolated regions, particularly in rural and insecure areas. ATRA identifies projects, requests proposals, and assigns the contract/license to the selected operator.

Other government strategies to promote telecommunications include (Shareef, Dzhupova, and Janowski 2011; Lokanathan 2012):

- e-Government (2006) includes, among others objectives, the improvement and creation of websites for government agencies and seven national universities, the establishment of an ICT center of excellence (Kabul IT-Park) to foster high-technology business, and improvement of ICT training and digital literacy.
- m-Government (2012) promotes the use of mobile applications throughout the government for better public service delivery and program management. It also includes an innovative grant program to assist ministries in implementing mobile-based solutions.

² Global System for Mobile communications (GSM) is an open digital cellular technology used for transmitting mobile voice and data services (GSMA 2013).

³ Local Fixed Service Provider.

Electricity Services

Although a prerequisite for nearly all forms of communication technologies, electricity remains an infeasible luxury for most Afghans. While the Afghan Energy Information Center reports that 36% of Afghans have 24-hour electricity, this mean is skewed upward by urban centers, where the average sits at 70% (Flak 2012). Based on a total population of 31 million (CIA World Factbook 2013), only about 25% of rural households (which compose more than 75% of the total population) have access to electricity. Although vast solar, wind, gas, and thermal resources imply that Afghanistan could produce up to 23,000 MW, existing Afghan power stations can only produce about 500 MW. Additionally, Da Afghanistan Breshna Sherkat (DABS), the national power utility, reports that only about half of this is actually produced due to resource shortages and poor facility maintenance. Consequently, Afghanistan relies heavily on power imports from neighbors, as well as costly, inefficient diesel generators (Flak 2012). Given the time and expense of even the most feasible improvement plans, this situation is unlikely to change in the near term (ibid).

Mobile Phone Services

As of December 31, 2012, MCIT reported that more than 88% of the Afghan population lives in a mobile phone coverage area. About 63% of rural people and 94% of urban dwellers use mobile phones, for a total of 19.67 million mobile phone users in country (72%) (MCIT 2012). Generally areas without mobile phone service are those beyond the outskirts of provincial capitals (Sharifi 2013). Although electricity is not the norm in rural areas, mobile phone users charge their devices with vehicle motors, generators, and other sources of energy (ibid). Since mobile phones first became available in 2002, the cost of ownership has decreased by about 97% thanks to pro-market policies (Lokanathan 2012) and healthy competition between providers (Hamdard 2012). This cost decrease has enabled rapid adoption of mobile phone technology. Because of their ubiquity, mobile phones have particular potential for distributing information (Wilcox 2013), especially to literate individuals, such as extension agents (Cochran Afghan Fellows 2013).

As of 2012, 48% of Afghan women own a mobile phone, and 32% have access to a family member's phone (USAID and Gharib 2013). These are striking increases from 2002, when 0% of Afghan women owned or had access to mobile phones (ibid). Nevertheless, there remains significant gender discrimination regarding cell phone access: about 9% of women report that they cannot afford the service; the remaining 11% lack permission from their family (ibid). This suggests that some portion of those who share phone access may also be restricted in the degree and type of information and/or communication access that they are permitted.

While SMS services are affordable, the cost of phone calls remains formidable for most Afghans. As of 2014, it cost about 3 Afghanis (AFN) (0.054 USD) per minute to make a phone call (Roshan 2014). Given the 2013 average per capita income of ~24,400 AFN (World Bank 2014), 1 hour of phone calls per month would cost about 8.9% of user salary. In terms of the 2011 American average per capita income, that would be like paying 394 USD⁴ per hour of talk time out of a 53,143 USD annual income (World Bank 2014). In combination with rampant illiteracy, these costs may limit the feasibility of mobile phone-based agricultural extension efforts in Afghanistan. Nevertheless, the novelty of mobile phones makes many people more willing to front the cost of calls (Cochran Afghan Fellows 2013), suggesting that at least initially these costs may be less of an obstacle than they may appear.

In addition to a form of communication, mobiles are a source of entertainment for Afghans. Street vendors offering music and game packages for download via Bluetooth or mobile memory cards are common. These vendors may be an important opportunity for dissemination of mobile-based extension content, including audio, video, and images. Additionally, the popularity of such services implies that Bluetooth and removable memory cards are widely used by Afghanistan.

In addition to two fixed line operators (Hamdard 2012), there are five exclusively-mobile operators in Afghanistan (Gonzalez Palau 2011; Salaam 2014):

- Afghan Wireless (AWCC) (3.5 million subscribers, 20%)
- Roshan (5.6 million subscribers, 32%)

⁴ 1 USD = 57.58 AFN. Xe.com, November 21 2014.

- MTN Afghanistan (4.5 million subscribers, 26%)
- Etisalat (3.5 million subscribers, 20%)
- Salaam (~700,000, 4%)

Roshan is currently the largest telecommunications providers in the country, providing mobile GSM service across all 34 provinces of Afghanistan, 230 districts, and all major cities (Roshan 2014). Roshan is the largest taxpayer and one of the largest employers in Afghanistan (Cisco 2012). Salaam, a service of the Ministry of Telecommunications and Information Technology, was launched in 2013 and markets itself as an approachable and low-cost option for mobile services, including 3G.

The establishment of infrastructure associated with mobile communications has given insurgent groups a point of leverage. Damage and destruction of mobile towers and electrical generators have been frequently used as a statement by rebel groups; during the 2009 presidential elections alone, the Taliban blew up 18 Roshan towers (Himelfarb 2010; Lokanathan 2012). Taliban has also been known to demand shutdown of mobile services in an effort to thwart international military activity. Consequently, towers are generally turned off at night in the southern and eastern parts of the country, where the Taliban presence is strongest. Nonetheless, this obstacle has been at least partially overcome by providing compensation (both monetary and electrical) to nearby communities that protect towers (Himelfarb 2010).

Radio Services

During the past 30 years of war, BBC Persian long-range AM radio broadcasts served as the singular source of news for most Afghans (Azizi 2011; Sharifi 2013). This long-standing source, in combination with the affordability and accessibility of radio technology, has embedded radio deep in the rural Afghan culture as a trusted source of news and information (Sharifi 2013). Today, while a rapidly developing (MCIT 2014c) television media movement has begun to gain attention in urban areas (Siddiq and Page 2012), radio remains the principal and often only source of news and entertainment for rural Afghans. Currently, 83% of rural Afghan households own a functional radio (compared to 73% in urban areas), and 80% of rural people listen to the radio (65% in urban areas). Men (83%) are more likely to listen to the radio

than women (69%) (The Asia Foundation 2012). While electricity is the exception in most rural communities, radios can be powered on batteries, which are inexpensive and widely available (Sharifi 2013). Radio also sidesteps the widespread illiteracy (90% of women and 63% of men) of rural Afghanistan.

As of 2010, there were over 175 radio stations in Afghanistan (Azizi 2011), including about a dozen international broadcasters and the national provider, Radio Television Afghanistan (RTA) (CIA World Factbook 2013). RTA has superior reach into rural areas (Azizi 2011); the international stations, including BBC (London), Azadi (Prague), and Bayan, among others, also enjoy a wide reach via AM channels, and have established various FM stations in recent years. The aforementioned broadcasters transmit sophisticated international news segments interspersed between programs designed for rural Afghan audiences in colloquial language.

Local radio stations have experienced substantial investment from development imperatives. The main driving force here has been the US media organization Internews. Internews helped establish more than 40 local FM stations, has trained hundreds of radio station staff (Siddiq and Page 2012), and has provided programming materials through a distribution service. In combination with innovation and commitment, this has resulted in at least a few successful stations. Some of these stations provide SMS services to people outside of coverage areas; this has proved valuable in emergency situations. Unfortunately, commercial investment remains limited, making it a struggle for these stations to break even without investor support (ibid). This problem is at least partially based in the very low numbers of local businesses looking to advertise. Consequently, radio programs appear and disappear every few months, and rural audiences are often unaware of the shows airing or their schedule (Cochran Afghan Fellows 2013).

Thanks to its low cost, accessible technology, wide reach, and non-literate approach, radio technology is by far the easiest way to disseminate information to rural populations (Cochran Afghan Fellows 2013). Nevertheless, radio is not without its detractors; some feel the lack of visual input makes information conveyed by radio impossible for uneducated populations to grasp (Wilcox 2013). Furthermore, the grass-roots approach that makes local radio stations so

approachable also has its challenges; their relative vulnerability has seemingly created security issues that have perhaps thwarted or deterred more radio-based extension efforts (Ayesha 2011; Effective Civil Partnerships n.d.). Furthermore, radio-based extension projects are for the most part unreported, making their methodology and results impossible to analyze. Finally, radio broadcasters typically work with only an Internet-connected computer and a personal mobile phone (Cochran Afghan Fellows 2013), suggesting that they may be underprepared to accommodate their own success.

Internet Services

To date, the Afghan government has licensed 51 internet service providers (ISPs) (ATRA 2013; MCIT 2012). At least 33 are in operation (Hamdard 2012). Nevertheless, Internet penetration remains at just 5% (~1.5 million users) in Afghanistan (Internet World Stats 2014), and about 5.6% of Afghans (up from <1% in 2012) go to the Internet for news and information (The Asia Foundation 2012; The Asia Foundation 2014). These statistics are likely due to a combination of high illiteracy and exorbitant service costs (Lokanathan 2012). Indeed, MCIT (2014a) recently announced that 1MB Internet service is now just 67 USD per month, down from 97 USD in 2013, 300 USD in 2012 and 5000 USD in 2002 (MCIT 2012). While these improvements are vast, an average per capita income of less than 40 USD per month keeps internet access far out of reach of the vast majority of Afghan households. Nonetheless, as with other telecommunications, the Internet is progressing quickly. The installation of a 4810 km national fiber-optic backbone (up to STM-64⁵) was begun in 2007 via funding from World Bank and the Afghan government (Hamdard 2012). The project is being implemented in three phases, and upon completion will connect all 34 provinces to 5 international neighbors (Lokanathan 2012). To date, this cable fully connects 20 provinces, partially connects 5 provinces, and connects Afghanistan to Iran, Pakistan, Tajikistan and Uzbekistan (MCIT 2014a). Upon completion, the optical fiber cable (OFC) will connect all 34 provinces to the three main Internet routes in the region (the Trans-Siberian Fiber, Trans-Euro/Asian Fiber and the SE-ME-WE-4 undersea cable system). Given this strategic geographic location, the OFC could collect significant revenues from North-South transit tariffs (Lokanathan 2012). Concomitantly, Internet

⁵ The highest transport hierarchy with a bit rate of ~10 Gbit/s.

usage, particularly of Facebook, is increasing rapidly: 1 in 3 Afghans reported the Internet as their primary source of information during the 2014 presidential elections (The Asia Foundation 2014).

Five mobile service providers (MTN, Roshan, Etisalat, Salaam, and Afghan Wireless) now offer 3G service (Gonzalez Palau 2011; MCIT 2012), which is used by almost all laptop owners in Afghanistan. Those with smart phones are also able to route computer Internet connectivity through their mobile devices. Both 3G technology and the fiber optic cable are expected to further reduce the cost of internet access (ibid.). Nevertheless, Internet literacy remains very limited; many Afghans are unaware of even basic functions (i.e. search engines) and use Internet access almost exclusively for social media (see below).

Social Media Services

Afghans—in particular young people—are very interested in social media. Limited Internet accessibility implies that only educated, employed Afghans participate in social media at the moment. However, as home, work, and mobile Internet access become increasingly more affordable, the Afghan presence in social media forums will increase. Facebook is currently by far the most popular social media outlet, and many times the only Internet service Afghans know how to use. Many organizations and government entities host Facebook pages. Twitter and LinkedIn are also commonly used. Bulk SMS-based social networking is also available through Paywast to users of AWCC, MTN, Etisalat, and Afghan Telecom (Paywast 2012). Paywast also offers advertising, among other services.

Summary of Initiatives

Completed, current and anticipated ICT extension initiatives in Afghanistan employ mobile phones, Internet, radio, video, social media, and computers. A summary of these projects is found in the table below in alphabetical order. Projects are then categorized by implementing sector (Government, NGO, Private, or University) and described in greater depth; where cross-sectoral collaborative implementation occurs, the project is listed under the implementing sector named first in the table. Within each category, projects are alphabetized, with current projects preceding completed projects.

Surprisingly, very few projects have utilized ICT to address agricultural development. For those projects that have been undertaken, information regarding what has worked well and what has not is difficult to glean; international funding marches on regardless of project status, and likewise ends at the appointed time indiscriminately of the success of the project. To boot, impact and lessons learned are frequently not well evaluated or recorded. Conflicting anecdotal project evaluations highlight the importance of local and up-to-date input when assessing any project's reach and effectiveness.

The lack of initiatives which fully engage with ICT to address the agricultural extension needs of Afghans has not gone unnoticed—fully half of those projects listed below of which ICT is central to their approach are new or prospective. Furthermore, while relatively few efforts currently employ ICT for agricultural extension, both ICT literacy/access and extension as separate topics are well addressed. These projects hold obvious sway over future initiatives to employ ICT in extension; as such, they are described in the Key Stakeholders section below.